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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/718,528	11/21/2000	John E. Dolan	SLA 0316	2544

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EXAMINER	
SETH, MANAV	

ART UNIT	PAPER NUMBER
2625	

DATE MAILED: 08/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/718,528	DOLAN, JOHN E.	
	Examiner	Art Unit	
	Manav Seth	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 April 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,7-10,13,14 and 16-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *15 and 22-25* is/are allowed.

6)☒ Claim(s) *1,7,9,10,14 and 16-19* is/are rejected.

7)☒ Claim(s) *8 and 13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to the Amendment

1. Amendment filed on 04 April 2005 has been entered in full and made of record.

2. Applicant's amendment to the claims has been entered in full and is persuasive. In view of the amendment to claims, 35 USC 112 2nd rejection on the respective claims have been withdrawn.

3. Applicant's amendment to the claims has been fully entered. In view of the amendment to claims, the objections on the respective claims have been withdrawn.

4. Applicant's arguments to the respective claims have been fully considered but are not persuasive. Applicant has amended the claims, examiner to reject the added limitations in view of the amendments made, have cited additional matter from the same prior art used in the previous art.

Response to Arguments

5. Applicant's arguments regarding the prior art rejections under Jefferson on pages 12 of 14 and page 13 of 14 of the Amendment filed on 04 April 2005 have been fully considered but are not persuasive.

6. In the 3rd paragraph of the page 12 of 14 and 3rd paragraph of page 13 of 14 of the Amendment, Applicant argues in substance:

a. Jefferson does not disclose the limitation "identifying the direction of a maximum intensity gradient for said edge" as recited in claim 1 and Jefferson does not disclose the

limitation "identifying an intensity direction for....said edge components" as recited in claims 10, 14 and 16.

Examiner respectfully disagrees. Jefferson clearly teaches identifying the direction of a maximum intensity gradient for said edge (Figures 2B and 2C; Column 3, Lines 30-63. Figure 2B depicts the intensity gradient (a part sloping upward or downward) at a direction transverse to the direction of the character strokes. As well known, edge-detection is widely used for text and image segmentation and edge is defined as a point in an image where the image gradient magnitude reaches a local maximum in the image gradient direction, or, equivalently, where the second derivative of brightness crosses zero in the image gradient direction and apparently if edge has no direction, no edge detection can take place and this is a well known fact. **Jefferson in column 4, lines 52-54 clearly discloses "Processor 34 tracks the position of the highest intensity level along the edge"** and apparently position of the highest intensity level (gradient) can only be determined if known the direction of this highest intensity level point, where it lies on the edge).

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 7, 9, 10, 14, 16-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Jefferson (U.S. 5,745,596).

Regarding Claim 1, Jefferson discloses a method for detecting text in a mixed-content image, said method comprising:

identifying an edge associated with a high-contrast intensity change (Figures 2A-2D; Column 1, Lines 29-33; Column 3, Lines 30-47);

identifying the direction of a maximum intensity gradient for said edge (Figures 2B and 2C; Column 3, Lines 30-63. Figure 2B depicts the intensity gradient (a part sloping upward or downward) at a direction transverse to the direction of the character strokes. As well known edge-detection is widely used for text and image segmentation and edge is defined as a point in an image where the image gradient magnitude reaches a local maximum in the image gradient direction, or, equivalently, where the second derivative of brightness crosses zero in the image gradient direction and apparently if edge has no direction, no edge detection can take place and this is a well known fact. **Jefferson in column 4, lines 52-54 clearly discloses "Processor 34 tracks the position of the highest intensity level along the edge"** and apparently position of the highest intensity level (gradient) can only be determined if known the direction of this highest intensity level point where it lies on the edge);

identifying a character stroke axis, wherein said axis is selected from the group consisting of a stroke valley and a stroke ridge (Figures 2A-2D; Column 3, Lines 24-50. Character strokes are shown in Figure 2A. Figure 2A depicts character pixels in a horizontal X-Y plane wherein each pixel is identified with its x-y coordinates. Figure 2B depicts pixel intensities in a Z-plane perpendicular to X-Y plane. **Stroke valleys and ridges are shown in Figure 2B for scan line 42, and similarly can be plotted for the stroke valleys and ridges of other scan lines parallel to scan line 42.** Each point on the curve shown in Figure 2B is located on a vertical line (axis) perpendicular to the X-Y plane and indicate the intensity of the pixel located at the intersection of

this vertical line (axis) and X-Y plane. Combination of Figure 2A and a plurality of Figures 2B for different scan lines will generate the three-dimensional intensity maps for character strokes "THE". As it is well known in digital image processing, the intensity axis of the intensity gradient curve (illustrated in Figures 2B and 2C) is in a direction transverse to the character stroke depicted in Figure 2A. The vertical axes perpendicular to X-Y plane are stroke axes. Furthermore, Lines 52 and 56, or perpendicular lines to intensity plane at locations 46, 48 and 50 are also stroke axes.);

measuring a substantially transverse distance between said axis and said edge (Figures 3 and 4; Column 3, Lines 30-67, Column 4, Lines 1-27; Column 5, Lines 14-67. MaxEdgeWidth which is set to 7 is a transverse distance between the stroke axis and the edge.); and

identifying said edge as a text edge when said substantially transverse distance is less than a threshold value (Figures 3 and 4; Column 4, Lines 30-63; Column 5, Lines 14-67. MaxEdgeWidth is an example of the threshold value.).

Regarding Claim 7, Jefferson further discloses the method of Claim 1 wherein said measuring a substantially transverse distance comprises measuring the proximity of an edge to an axis in a direction parallel with said intensity gradient direction (Figures 3 and 4; Column 3, Lines 30-67, Column 4, Lines 1-27; Column 5, Lines 14-67).

Regarding Claim 9, Jefferson further discloses method of Claim 1 wherein said measuring a substantially transverse distance comprises the acts of:

beginning at a subject pixel that has been identified as an edge and progressively analyzing adjacent pixels in a direction parallel with the intensity gradient of the subject pixel (Figures 2B and 2C; Column 3, Lines 24-50); and

analyzing each successive pixel to determine whether said successive pixel has been identified as a character stroke axis pixel (Figures 2B, 2C and 3; Column 3, Lines 24-67, Column 4, Lines 1-27).

With regards to Claims 10, arguments analogous to those presented for Claims 1, 7 and 9 are applicable to Claim 10.

With regards to Claim 14, arguments analogous to those presented for Claims 1, 7 and 9 are applicable to Claim 14.

With regards to Claims 16 and 17, arguments analogous to those presented for Claims 1, 7, 9, 10 and 14 are applicable to Claims 16 and 17.

With regards to Claims 18 and 19, arguments analogous to those presented for Claims 1, 7, 9, 10, 14, 16 and 17 are applicable to Claims 18 and 19.

Allowable Subject Matter

Reasons of Allowance:

9. Claims 8 and 13 are objected to as being dependent upon a rejected base claim for the same reasons as disclosed in the previous office action, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. Claim 22 is allowed (similarly disclosed in the previous office action).

The following is an examiner's statement of reasons of allowance:

Claim 22 of the instant invention recites a method for detecting text in a mixed-content image, by identifying an edge associated with a high-contrast intensity change and an intensity gradient direction for said edge. The instant invention further identifies a character stroke axis from the group consisting of a stroke valley or a stroke ridge by analyzing image components until the **change in curvature of the intensity curve between two successive image components in a direction substantially parallel to the intensity gradient direction reaches a maximum absolute value at the same position that the change in curvature of the intensity curve in a direction substantially perpendicular to the intensity gradient direction is near zero, wherein the curvature of the intensity curve is calculated by solving for the eigenvalues of a Hessian matrix.**

The edge will be identified as a text edge when the distance, in the intensity gradient direction, between the character stroke axis and the edge is less than a threshold value.

The features identified in bold letters are neither discussed nor suggested by the prior arts of record.

11. Claims 15, 23, 24 and 25 are allowed.

The following is an examiner's statement of reasons of allowance:

The reasons of allowance for **claims 15, 23, 24 and 25** are evident from applicant's remarks/arguments in 2nd paragraph of page 11 of 14 of the amendment filed on 04 April 2005 and appropriate amendments to the claims in view of the previous office action.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Silver et al., U.S. Patent No. 6,408,109, discloses a system and method for detecting and sub-pixel location of edges in a digital image.
- Wayner et al., U.S. Patent No. 5,253,307, discloses techniques that obtain data indicating a distribution of distances across connected components in each of a plurality of directions within an image that includes text.
- Norimatsu, U.S. Patent No. 6,415,053, discloses the image processing method and apparatus to calculate and store gradients representing directions and intensities of a pixel of interest.
- Tomita et al., U.S. Patent No. 5,202,928, discloses an image processing methods for matching edges detected in images by using edge detection.
- Cass et al., U.S. Patent No. 5,245,674, discloses image processing using distance as a function of direction.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Manav Seth whose telephone number is (571) 272-7456. The examiner can normally be reached on Monday to Friday from 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta, can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system,

see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Manav Seth
Art Unit 2625
August 19, 2005

KANJIBHAI PATEL
PRIMARY EXAMINER